

# ImmunoCAP® X-map

Tec		Allergen Component			Possible Cross-Reactivity																								
ISAC	ImmunoCAP	SOURCE	COMPONENT	PROTEIN FAMILY OR FUNCTION	Fruits	Vegetables	Nuts and seeds	Legumes	Cereals	Spices	Grass pollen	Weed pollen	Tree pollen	Latex	Molds	Animals	Meat	Milk	Egg	Fish	Seafood	Parasites	Mites	Insects	Venoms				
		FOODS OF PLANT ORIGIN	Kiwi	Act d 1	Cysteine protease	•																							
x				Act d 2	Thaumatin-like protein	•																							
x				Act d 5	Kiwelin	•																							
x	x			Act d 8	PR-10																								
x	x			Api g 1	PR-10																								
x				Dau c 1	PR-10																								
x				Mal d 1	PR-10																								
x	x			Pru p 1	PR-10																								
x	x			Pru p 3	LTP																								
	x			Pru p 4	Profilin																								
x	x			Ber e 1	Storage protein, 2S albumin			•																					
x				Ana o 2	Storage protein, 2S albumin			•																					
				Ana o 3	Storage protein, 2S albumin			•																					
x	x			Cor a 1.0401	PR-10																								
	x			Cor a 8	LTP																								
	x			Cor a 9	Storage protein, 11S globulin																								
				Jug r 1	Storage protein, 2S albumin			•																					
				Jug r 3	LTP			•																					
x				Ses i 1	Storage protein, 2S albumin			•																					
x	x			Ara h 1	Storage protein, 7S globulin				•																				
x	x			Ara h 2	Storage protein, 2S albumin				•																				
x	x			Ara h 3	Storage protein, 11S globulin				•																				
x	x			Ara h 8	PR-10																								
2010	x			Ara h 9	LTP																								
x	x			Gly m 4	PR-10																								
x	2010			Gly m 5	Storage protein, beta-conglycinin																								
x	2010			Gly m 6	Storage protein, glycinin																								
x				Gliadin	Gliadin																								
x	x			Tri a 19	Omega 5 gliadin					•																			
x				Tri a 18	Agglutinin isolectin 1																								
x				Tri a aA_T1	Alpha-amylase/trypsin inhibitors																								
		GRASS POLLEN	Bermuda	Cyn d 1	Grass group 1																								
x	x		Timothy	Phl p 1	Grass group 1																								
x	x			Phl p 2	Grass group 2																								
x	x			Phl p 4	Berberine bridge enzyme																								
x	x			Phl p 5	Grass group 5																								
x	x			Phl p 6	Grass group 6																								
x	x			Phl p 7	Polcalcin																								
x	x			Phl p 11	Trypsin inhibitor																								
		TREE POLLEN		Phl p 12	Profilin																								
x			Alder	Aln g 1	PR-10																								
x	x		Birch	Bet v 1	PR-10																								
x	x			Bet v 2	Profilin																								
x	x			Bet v 4	Polcalcin																								
	x			Bet v 6	Isoflavone reductases																								
x			Hazel	Cor a 1.0101	PR-10																								
x	x		Cypress	Cup a 1	Pectate lyase																								
x			Japanese cedar	Cry j 1	Pectate lyase																								
x	x		Olive	Ole e 1	Trypsin inhibitor																								
x				Ole e 2	Profilin																								
2010	2010			Ole e 7	LTP																								
				Ole e 9	Glucanase																								
x			Plane	Pla a 1	Invertase inhibitor																								
x				Pla a 2	Polygalacturonases																								
		WEED POLLEN	Ragweed	Amb a 1	Pectate lyase																								
x	x		Mugwort	Art v 1	Defensin																								
x	x			Art v 3	LTP																								
x	x		Wall pellitory	Par j 2	LTP																								
x	x		Saltwort	Sal k 1	Pectin methylesterase																								
			Pigweed	Che a 1	Trypsin inhibitor																								
x			Mercury	Mer a 1	Profilin																								
			Plantain	Pla 11	Pectate lyase																								

## Important Allergen Families

### LTP (non-specific Lipid Transfer Protein, nsLTP)

- A protein stable to heat and digestion causing reactions also to cooked foods.
- Often associated with systemic and more severe reactions in addition to oral allergy syndrome (OAS).
- Often associated with allergic reactions to fruit and vegetables in southern Europe.

### Storage proteins

- Proteins found in seeds serving as source material during the growth of a new plant.
- Often stable and heat-resistant proteins causing reactions also to cooked foods.

### PR-10 protein, Bet v 1 homologue

- A heat labile protein, cooked foods are often tolerated.
- Often associated with local symptoms such as OAS.
- Often associated with allergic reactions to fruit and vegetables in northern Europe.

### Profilin

- An actin-binding protein showing great homology and cross-reactivity even between distant related species.
- Recognized as a minor allergen in plants and plant-related foods.
- Seldom associated with clinical symptoms but may cause demonstrable or even severe reactions in a small minority of patients.

### CCD

- Cross-reactive carbohydrate determinants are seldom associated with clinical symptoms but may cause demonstrable or even severe reactions in a small minority of patients.

### Lipocalin

- Stable proteins and important allergens in animals
- Allergen components displaying limited cross-reactivity between species.

### Parvalbumin

- A major allergen in fish.
- A marker for cross-reactivity among different species of fish and amphibians.
- A protein stable to heat and digestion causing reactions also to cooked foods.

### Tropomyosin

- An actin-binding protein in muscle fibers.
- A marker for cross-reactivity between crustaceans, mites and cockroach.

### Serum albumin

- A common protein present in different biological fluids and solids, eg. cow's milk and beef, eggs and chicken.
- Cross-reactions between albumins from different animal species are well known, for example between cat and dog and cat and pig.

## Important Allergens

### Ara h 1, 2, 3, 8 and 9 (peanut)

- IgE abs to Ara h 1, 2, 3 and 9 (LTP) are associated with peanut reactions, which in many cases can be severe.
- IgE abs to Ara h 8 (PR-10) are usually associated with milder, local symptoms such as OAS, originating from birch sensitization.

### Ovomucoid (egg white)

- IgE abs to ovomucoid are associated with persistent egg allergy and usually neither raw nor cooked is tolerated.

### Omega-5 gliadin/ Tri a 19 (wheat)

- IgE abs to omega-5 gliadin (Tri a 19) in adults are associated with a risk of exercise- or NSAIDs-induced reactions in connection with wheat ingestion.
- IgE abs to omega-5 gliadin in children are associated with a risk of immediate reactions to wheat.

### Alt a 1 (Alternaria)

- IgE abs to Alt a 1 are associated with asthma development.

### Gly m 4, 5 and 6 (soy)

- Gly m 5 and 6 are associated with clinical reactions to soy. Gly m 5 - Ara h 1 and Gly m 6 - Ara h 3 share homologous structures.
- IgE abs to Gly m 4 (PR-10) are usually associated with milder, local symptoms such as OAS, originating from birch sensitization.

- Primarily species-specific allergen

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x	x	LATEX	Latex	Hev b 1	Rubber elongation factor																							
x	x			Hev b 3	Small rubber particle protein																							
x	x			Hev b 5	Acidic protein																							
x	x			Hev b 6	Hevein																							
x	x			Hev b 8	Profilin																							
	x			Hev b 9	Glycolytic enzyme																							
	x			Hev b 11	Chitinases																							
x	x	CCD	Bromelin	Ana c 2	CCD																							
	x			MUXF3 CCD	CCD																							
x	x	FOOD OF ANIMAL ORIGIN	Milk	Bos d 4	Alpha-lactalbumin																							
x	x			Bos d 5	Beta-lactoglobulin																							
x	x		Cow	Bos d 6	Serum albumin																							
x	x		Milk	Bos d 8	Caseins																							
x	x			Lactoferrin	Transferrin																							
x	x		Egg white	Gal d 1	Ovomucoid																							
x	x			Gal d 2	Ovalbumin																							
x	x			Gal d 3	Conalbumin																							
x			Egg yolk/chicken	Gal d 5	Livetin (serum albumin but species specific)																							
x	x		Carp	Cyp c 1	Parvalbumin																							
x	x		Cod	Gad c 1	Parvalbumin																							
x	x		Shrimp	Pen a 1	Tropomyosin																							
x				Pen i 1	Tropomyosin																							
x				Pen m 1	Tropomyosin																							
x	x	MITES	Mite	Der p 1	Cysteine protease																							
x	x			Der p 2	NPC2 family																							
x	x			Der p 10	Tropomyosin																							
x				Der f 1	Cysteine protease																							
x				Der f 2	NPC2 family																							
x				Eur m 2	NPC2 family																							
x	x	ANIMALS	Dog	Can f 1	Lipocalin																							
x	x			Can f 2	Lipocalin																							
x	x			Can f 3	Serum albumin																							
x	x		Cat	Fel d 1	Uteroglobin																							
x	x			Fel d 2	Serum albumin																							
x				Fel d 4	Lipocalin																							
x			Mouse	Mus m 1	Lipocalin																							
			Horse	Equ c 1	Lipocalin																							
x			Horse	Equ c 3	Serum albumin																							
	x		Pig	Sus s PSA	Serum albumin																							
x	x	MOLD	Alternaria	Alt a 1	Acidic glycoprotein																							
x				Alt a 6	Enolase																							
x	x		Aspergillus	Asp f 1	Mitogillin family																							
x	x			Asp f 2	Fibrinogen binding proteins																							
x	x			Asp f 3	Peroxisomal protein																							
x	x			Asp f 4	Unknown																							
x	x			Asp f 6	Mn superoxide dismutase																							
x		Cladosporium	Cla h 8	Mannitol dehydrogenase																								
x		COCKROACH	Cockroach	Bla g 1	Cockroach group 1																							
x				Bla g 2	Aspartic protease																							
x				Bla g 4	Calycin																							
x				Bla g 5	Glutathione S-transferase																							
				Bla g 7	Tropomyosin																							
x	x	VENOM	Bee	Api m 1	Phospholipase A2																							
x				Api m 4	Melittin																							
2010	2010		Paper wasp	Pol d 5	Ag 5																							
			Wasp	Ves v 1	Phospholipase A1																							
2010	2010			Ves v 5	Ag 5																							
x		PARASITE	Anisakis	Ani s 1	Serine protease inhibitor																							
x				Ani s 3	Tropomyosin																							

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- Primarily species-specific allergen